

20 April 2006

Mr. Craig Abernathy
Research Specialist
Montana Department of Transportation
2701 Prospect Ave.
P.O. Box 201001
Helena, MT 59620-1001

Re: Concrete Mixture Specification Development, MDT Contract No. 8156-03
WJE No. 2001.2245.1

Dear Mr. Abernathy:

Per your request, we are pleased to submit this proposal for the development of specifications for high performance concrete for use by the Montana Department of Transportation (MDT) in bridge decks. During prior work conducted at Wiss, Janney, Elstner Associates, Inc. (WJE), the performance of high performance concrete mixture designs developed for increased durability was explored. To help realize the potential of these concrete mixtures in Montana bridges, a re-writing of the concrete specifications is needed.

The initial goal is a Special Provision for High Performance Concrete that will be used for decks only until experience with the provision is gained. Later work may include expanding the Special Provision to other bridge elements and development of a Standard Specification.

Scope of work

The proposed work in the development of these specifications is divided into three tasks: HPC Specification, Quality Control Plan, and Implementation Support.

1) Development of Performance-based HPC Specification -

To maximize the efficiency of the construction process, the concrete special provision to be developed will be primarily performance-based. This type of specification allows the contractor great flexibility to meet the job requirements in a manner that is least expensive for the state and that is targeted at producing the best final product. However, since short-term testing is not adequate to assess all aspects of long-term durability and to best implement the developmental work already completed, some guidelines for the mix designs will be specified.

This specification will cover each step in the process for submittals, approval, and implementing high performance mixtures that include supplementary cementitious materials (SCMs). The specification will include provisions covering raw material prequalification, including cement, SCMs and aggregates. A trial placement will be specified that will allow the assessment of the batching, mixing, transporting,

placement and finishing of the HPC. The parameters of a trial batching and trial placement for contractors who have not used the proposed concrete mixture on a previous MDT job and for those that have successfully used the mixture on a previous MDT job will be outlined.

The individual performance components of the hardened concrete will include:

- Compressive strength
- Abrasion resistance
- Free drying shrinkage
- Rapid chloride permeability
- Chloride diffusion coefficient
- Parameters of the air void network

Finally, pay incentives and disincentives will also be covered.

2) Quality Control Plan and Requirements -

A quality control plan to be implemented by the contractor and a supplementary quality assurance plan to be conducted by the DOT or project team will be developed. The specification will include prequalification's necessary for the concrete producer, site personnel, and testing laboratories. Consistent, accurate laboratory testing is an essential part of the enforcement of performance based specifications. Therefore, appropriate personnel qualifications and laboratory certifications will be identified as part of the specification development process. Testing frequencies will be based on the project schedule and the quantity of concrete produced. Local laboratories capable of supporting the testing necessary to implement this specification will be identified with the help of HDR and DOT staff.

3) Implementation Support -

WJE and HDR personnel will assist with the implementation of this HPC specification by supporting coordination and training efforts with MDT staff and contractors. Conferences with MDT representatives and the participation in pre-bid meetings are anticipated. An outreach program to contractors interested in bidding projects to be governed by this specification will also be developed.

HDR, Inc. of Missoula, MT will assist this work by reviewing the draft work product, assisting with the identification of qualified testing laboratories, attending pre-bid meetings, and coordinating the outreach with interested parties in Montana. They provide the team with a familiarity with the MDT specifications and policies and a local presence. They are also available to assist with implementation of the new specifications into their current Butte area bridge design work and provide construction engineering support.

Milestones

It is proposed that the following three milestones be observed during the specification development process. At the 80% completion milestone, which will include preparation of the specification outline and an initial draft of the QC plan, these work products will be submitted for review by MDT representatives. It is envisioned that a follow-up teleconference will be included as part of the review process. When a complete draft incorporating the suggestions of these representatives is ready, we will again ask for input

to ensure that all relevant issues have been addressed to the satisfaction of MDT. A final specification will then be submitted.

Budget

A budget of \$20,000 is recommended for this work, as detailed below.

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|----------------------------|-----------|
| 1. HPC Specification | \$ 10,500 |
| 2. Quality Control Plan | \$ 6,000 |
| 3. Implementation Support. | \$ 3,500 |

All work will be conducted according to the terms of our original agreement for Contract No. 8156-03. The project schedule, project reporting and personnel hours are attached. We look forward to working with you on this interesting project. We are available to start work as soon as you provide us authorization to proceed.

Please contact us with any questions.

Very truly yours,

WISS, JANNEY, ELSTNER ASSOCIATES, INC.



John Lawler
Senior Associate



Paul Krauss, P.E.
Senior Consultant
Project Manager

Enclosure

ltr-jlawler-proposal hpc spec developement.doc

Appendix

Proposed Time Schedule for Concrete Specification Development

Task		Start Date	80% Submittal	Completion Date
HPC Specification		July 1, 2006	August 18, 2006	October 6, 2006
Quality Control Plan		July 17, 2006	August 31, 2006	October 6, 2006
Implementation Support		August 31, 2006	- -	December 15, 2006

Project Reporting

80% Draft concrete specification	August 18, 2006
80% Draft QC Plan	August 31, 2006
Review of 80% submittal Spec. by MDT	September 8, 2006
Review of 80% submittal QC Plan by MDT	September 22, 2006
Final HPC specification & Final QC Plan	October 6, 2006

Personnel Hours

Personnel Hours	HPC Specification	Quality Control Plan	Implementation Support	Total Hours
Senior Consultant - Paul Krauss	46	22	14	82
Senior Engineer - John Lawler	13	12	7	32
Total Hours	59	34	21	114